

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Determinants of antenatal care utilisation in sub-Saharan Africa: a systematic review
AUTHORS	Okedo-Alex, Ijeoma; Akamike, Ifeyinwa; Ezeanosike, Obumneme; Uneke, Chigozie

VERSION 1 – REVIEW

REVIEWER	Gezahegn Tesfaye Haramaya University, Ethiopia
REVIEW RETURNED	04-Jun-2019

GENERAL COMMENTS	<p>Thank you for inviting to review this manuscript with an important research topic.</p> <p>Please find my comments below.</p> <p>Registration</p> <ul style="list-style-type: none">-Does this systematic review registered in online registry such as PROSPERO, if so please give the registration number. <p>Abstract</p> <ol style="list-style-type: none">1. Please avoid use of abbreviations in the abstract2. Would be better if you could expand the Method section, and remove the very details about the search terms <p>Introduction</p> <p>This section is well articulated except some issues</p> <ul style="list-style-type: none">-Please cite "Various studies assessed factors affecting ANC utilization in SSA countries"-Line 21, "more likely to utilise these services more than the non-attenders.[11–16]" please remove the word "more" after "these services"-As the authors use Anderson model for presenting the review, it would be good if they at least mention this in one sentence in the introduction. <p>Method</p> <ul style="list-style-type: none">-What is the justification for use of 2008 to limit the search?-Authors are encouraged to supply the corresponding search result for each database search including the date of last search.-Your inclusion criteria should also add some specific criteria that you have applied to select the papers (from the Title/abstract to the final inclusion of the papers).-During the appraisal of the studies; how many authors involve? How was the level of agreement between the two authors? and how was it managed?-Add the initial of the authors involved in each step of the review. <p>Results</p> <ul style="list-style-type: none">-The determinants of ANC use were presented using the "predisposing", "Enabling", and "Need" factors category. However the authors conclude their findings using the categories "social determinants of health", "family and inter-spousal/partner
-------------------------	---

	<p>dynamics", "previous pregnancy experiences", "health system factors and policy factors".</p> <p>Discussion</p> <ul style="list-style-type: none"> -Nicely written but needs re-organization. The flow of the discussion should follow some logical patterns. For instance, you start with discussing "health insurance" in the second paragraph, and then goes to "Age" in the third paragraph: but the two are not in same category of determinants that you proposed. -Also, this part needs shortening and make it concise. You don't need to discuss every findings. -Is "quality ANC package" among the outcome variables that you studied? if so please add review of the determinants for this outcome variable, and discuss it. -You compared some of your review findings with primary studies like (ref 117), but it is advised to compare with other systematic review findings, or established guidelines, or studies which encompass several settings. <p>Conclusion</p> <ul style="list-style-type: none"> -Your recommendations are appeared to be broader to be applied for increasing ANC uptake and try to be a bit specific based on your findings. <p>Limitation</p> <ul style="list-style-type: none"> -The authors mentioned the measurement of ANC use by "At least one, three and Four" as a limitation. However they can solve this limitation in their review, because "At least one ANC use" and "at least four ANC use" are different. I suggest the authors to separately review papers which defined ANC use with "at least one" and "at least four", and probably exclude the papers with "at least three". This way they can report the factors that influence "Overall uptake of ANC" based on those papers that defined ANC use as at least one visit, and the "Frequency of ANC" based on papers that defined ANC use as at least four visit. In fact it is expected that the authors initially put this in their Inclusion and exclusion criteria, and then screen and include those papers that go with their definition. -Similar approach may be followed for "Timing of ANC" with the due consideration of the WHO recommendation.
--	--

REVIEWER	Masamine Jimba The University of Tokyo, Japan
REVIEW RETURNED	12-Jun-2019

GENERAL COMMENTS	<p>This is a well-written systematic review article highlighting the factors associated with the utilization of ANC services in sub-Saharan Africa. More than two databases were used for the review of articles between 2008 and 2018 and 87 studies met the criteria for their review. They identified many factors that affect ANC service utilization, such as social determinants of health, etc. In conclusion, intersectoral collaboration was recommended to improve the utilization. As the authors clearly stated in the introduction (P4 L23), ANC service utilization means a lot: at least one visit, at least four visits, trimester timing of ANC visits, service received, and care provider type. In the results, the authors used 'at least one ANC visit' and 'at least four ANC visits and the timing of ANC visits for data analysis, but this selection was not clearly justified. The variety of these aspects are not fully reflected in the data analysis, either. What does it mean by ANC utilization is therefore not specific enough in the results. In addition to this</p>
-------------------------	---

	<p>major issue, the following points may be considered to improve the manuscript.</p> <ol style="list-style-type: none"> 1. P2 L19: Predictors of ANC use: ANC use mean what? At least one visit or all aspects of ANC use? 2. P2 L22: 'utilize ANC promptly': all four ANC services? 3. P2 L28: The same as above. ANC utilization means...? 4. P3 L31: Developing countries mean what? Does it also include upper-middle income countries such as Thailand? 5. P3-4: Is it possible to justify the literature search period 'between 2008 and 2018'? Is there any possibility that before 2008 and after 2008 make a difference? 6. P5 L37: Research design also may be added for inclusion and exclusion criteria. 7. P5 L37: If French literature was excluded, it might affect representation of SSA, and this point should be written as one of limitations in the discussion. 8. P8 L38: ANC attendance means the first one, or four ANC attendance. In many other results, this point is not clearly described. 9. P17 L6: The first paragraph of the discussion should not include limitation of the study. Before conclusion, limitation section should be made and at least one paragraph is necessary to describe limitations, such as excluding French literature. 10. P17 L33~: This study used the Anderson framework and showed the results under the subheadings of the predisposing, enabling and need factors. However, in the discussion, this framework is not effectively used and many non-modifiable factors are discussed one by one. The structure of the discussion may be reconsidered and modifiable factors may be more discussed. 11. P22 L23: Compared with 'before 2008' situation, can this study say something new after 2008 by this analysis? 12. P22, L30: Multi-stakeholder intersectoral collaboration can be a good recommendation, but it is not totally new. Any specific examples, which are feasible for implementation in SSA? 13: p25 References: Please check references one by one. For example, Ref 103, 108 are not correctly spelled.
--	--

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Gezahegn Tesfaye

Institution and Country: Haramaya University, Ethiopia

Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below

Thank you for inviting to review this manuscript with an important research topic.

Please find my comments below.

Registration

-Does this systematic review registered in online registry such as PROSPERO, if so please give the registration number.

Response: The systematic review was not registered on any online registry

Abstract

1. Please avoid use of abbreviations in the abstract

Response: Abbreviations have been removed from the abstract

2. Would be better if you could expand the Method section, and remove the very details about the search terms

Response: The search terms have been removed and the methods section expanded

Introduction

This section is well articulated except some issues

-Please cite "Various studies assessed factors affecting ANC utilization in SSA countries"

Response: This statement has been cited

-Line 21, "more likely to utilise these services more than the non-attenders.[11–16]" please remove the word "more" after "these services"

Response: The word "more" after "these services" has been removed

-As the authors use Anderson model for presenting the review, it would be good if they at least mention this in one sentence in the introduction.

Response: Andersen model has been mentioned in the introduction

Method

-What is the justification for use of 2008 to limit the search?

Response: The review used 2008 to limit the search because a similar review covering years before 2008 was published in 2008 ie (Simkhadad et al 2008)

-Authors are encouraged to supply the corresponding search result for each database search including the date of last search.

Response: The search results have been updated for each database and added as a supplementary file.

-Your inclusion criteria should also add some specific criteria that you have applied to select the papers (from the Title/abstract to the final inclusion of the papers).

Response: Specific criteria for selection of papers at various stages have been added

-During the appraisal of the studies; how many authors involve? How was the level of agreement between the two authors? and how was it managed? -Add the initial of the authors involved in each step of the review.

Response: Screening of titles and abstracts and the full texts was carried out independently by two of the review authors (INO and ICA). Any disagreements were resolved through discussion and consensus between the two review authors or with the help of the third author (OBE). This information has been added under the data extraction section of the manuscript

Results

-The determinants of ANC use were presented using the "predisposing", "Enabling", and "Need" factors category. However the authors conclude their findings using the categories "social determinants of health", "family and inter-spousal/partner dynamics", "previous pregnancy experiences", "health system factors and policy factors".

Response: The grouping of the determinants of ANC use have been revised in line with the Andersen framework

Discussion

-Nicely written but needs re-organization. The flow of the discussion should follow some logical patterns. For instance, you start with discussing "health insurance" in the second paragraph, and then goes to "Age" in the third paragraph: but the two are not in same category of determinants that you proposed.

-Also, this part needs shortening and make it concise. You don't need to discuss every findings.

Response: The discussion section has been re-organized using the Andersen framework categories and shortened as well.

-Is " quality ANC package" among the outcome variables that you studied? if so please add review of the determinants for this outcome variable, and discuss it.

Response: Quality ANC package was not part of the outcome variables. Some studies identified quality/content of ANC services as a determinant of ANC utilisation and this was presented in the result section.

-You compared some of your review findings with primary studies like (ref 117), but it is advised to compare with other systematic review findings, or established guidelines, or studies which encompass several settings.

Response: The discussion section has been revised with better comparisons

Conclusion

-Your recommendations are appeared to be broader to be applied for increasing ANC uptake and try to be a bit specific based on your findings.

Response: The conclusion has been revised to be more specific based on identified determinants.

Limitation

-The authors mentioned the measurement of ANC use by "At least one, three and Four" as a limitation. However they can solve this limitation in their review, because "At least one ANC use" and "at least four ANC use" are different. I suggest the authors to separately review papers which defined ANC use with "at least one" and "at least four", and probably exclude the papers with "at least three".

This way they can report the factors that influence "Overall uptake of ANC" based on those papers that defined ANC use as at least one visit, and the "Frequency of ANC" based on papers that defined ANC use as at least four visit. In fact it is expected that the authors initially put this in their Inclusion and exclusion criteria, and then screen and include those papers that go with their definition.

-Similar approach may be followed for "Timing of ANC" with the due consideration of the WHO recommendation.

Response: Thank you for this excellent suggestion. This has been implemented and the results section revised in line with this.

Reviewer: 2

Reviewer Name: Masamine Jimba

Institution and Country: The University of Tokyo, Japan

Please state any competing interests or state 'None declared': None declared.

Please leave your comments for the authors below

This is a well-written systematic review article highlighting the factors associated with the utilization of ANC services in sub-Saharan Africa. More than two databases were used for the review of articles between 2008 and 2018 and 87 studies met the criteria for their review. They identified many factors that affect ANC service utilization, such as social determinants of health, etc. In conclusion, intersectoral collaboration was recommended to improve the utilization.

As the authors clearly stated in the introduction (P4 L23), ANC service utilization means a lot: at least one visit, at least four visits, trimester timing of ANC visits, service received, and care provider type. In the results, the authors used 'at least one ANC visit' and 'at least four ANC visits and the timing of ANC visits for data analysis, but this selection was not clearly justified. The variety of these aspects are not fully reflected in the data analysis, either. What does it mean by ANC utilization is therefore not specific enough in the results. In addition to this major issue, the following points may be considered to improve the manuscript.

Response: The authors have clearly defined ANC utilisation using the WHO recommendation and revised the results and other aspects of the manuscript in line with this definition. We hope, this has removed ambiguities and improved the clarity of the manuscript.

1. P2 L19: Predictors of ANC use: ANC use mean what? At least one visit or all aspects of ANC use?

Response: In the context of this review, ANC use refers to ANC attendance (at least one and at least four visits) and initiation of first ANC visit in first trimester (<12 weeks of pregnancy). This information has been added to the methods section under inclusion criteria.

2. P2 L22: 'utilize ANC promptly': all four ANC services?

Response: This refers to timing of first ANC visit i.e. whether booking was early or late. Early booking is as defined in the primary studies most of which adapted the WHO definition. Promptness as used in the statement refers to early initiation of ANC (early booking) following pregnancy awareness. The statement has been rephrased to portray the appropriate meaning.

3. P2 L28: The same as above. ANC utilization means...?

Response: In the context of this review, ANC use refers to ANC attendance (at least one and at least four visits) and initiation of first ANC visit in first trimester (<12 weeks of pregnancy). This information has been added to the methods section under inclusion criteria.

4. P3 L31: Developing countries mean what? Does it also include upper-middle income countries such as Thailand?

Response: This statement on developing countries was cited from a WHO factsheet and the document did not define the countries referred to as 'developing'. However, this document went on to state that more than half of these deaths occur in sub-Saharan Africa and almost one third occur in South Asia (This part was not cited).

5. P3-4: Is it possible to justify the literature search period 'between 2008 and 2018'?

Response: The review used 2008 to limit the search because a similar review covering years before 2008 was published in 2008.

5b) Is there any possibility that before 2008 and after 2008 make a difference?

Response: The determinants identified from this review appear similar to that from the review of 2008 although slight differences exist. However, given the maternal health (ANC inclusive) specific interventions in sub-Saharan Africa, it is possible that antenatal attendance has improved however this study did not estimate or quantify ANC attendance but was focused on the determinants. For example, the earlier review of 2008 found that local beliefs such as fear of witchcraft (due to blood sample collection for lab tests) as a deterrent of ANC use however presently, it is possible that women are getting more enlightened and as such not holding on to such beliefs.

6. P5 L37: Research design also may be added for inclusion and exclusion criteria.

Response: Research designs have been added to inclusion and exclusion criteria

7. P5 L37: If French literature was excluded, it might affect representation of SSA, and this point should be written as one of limitations in the discussion.

Response: The exclusion of French literature has been written as a limitation in the discussion

8. P8 L38: ANC attendance means the first one, or four ANC attendance. In many other results, this point is not clearly described.

Response: : In the context of this review, ANC use refers to ANC attendance (at least one and at least four visits) and initiation of first ANC visit in first trimester (<12 weeks of pregnancy). This information has been added to the methods section under inclusion criteria. The results have been reorganized to reflect this

9. P17 L6: The first paragraph of the discussion should not include limitation of the study. Before conclusion, limitation section should be made and at least one paragraph is necessary to describe limitations, such as excluding French literature.

Response: The first paragraph of the discussion focused on limitations has been removed. A limitation section has been made and a paragraph used to describe limitations before the conclusion section.

10. P17 L33~: This study used the Anderson framework and showed the results under the subheadings of the predisposing, enabling and need factors. However, in the discussion, this framework is not effectively used and many non-modifiable factors are discussed one by one. The structure of the discussion may be reconsidered and modifiable factors may be more discussed.

Response: The discussion has been restructured in line with the Andersen framework

11. P22 L23: Compared with 'before 2008' situation, can this study say something new after 2008 by this analysis?

Response: See response on 5b above

12. P22, L30: Multi-stakeholder intersectoral collaboration can be a good recommendation, but it is not totally new. Any specific examples, which are feasible for implementation in SSA?

Response: The findings from this review showed that the determinants of ANC span the education, finance, rural and community development, works, transport, labour (and employment) and health sectors hence our recommendation. Examples would include health-in-all policies, joint stakeholder policy, planning and implementation review meetings, capacity development for policy makers on intersectoral cohabitations secondments and having desk officers represent related ministries (sectors above) in the ministry of health. An example of the implementation will be the educational sector encouraging enrolment of in schools while the health sector participates in curriculum development to include basic information on care in pregnancy (ANC inclusive). The ministries of works, labour, and employment can lay their part by road construction to improve access to health facilities especially in rural underdeveloped areas, subsidised transport for pregnant women, provision regular electricity to enable access to electronic media, provision of job and empowerment opportunities for women. The finance ministry can partner to provide loans, grants, conditional cash transfers, and other forms of financial empowerment to women.

13: p25 References: Please check references one by one. For example, Ref 103, 108 are not correctly spelled.

Response: References have been checked and corrected. Ref 103, 108 have been corrected.

VERSION 2 – REVIEW

REVIEWER	Gezahegn Tesfaye Girma Haramaya University, Ethiopia
REVIEW RETURNED	05-Aug-2019

GENERAL COMMENTS	The authors have adequately addressed the review comments and I have no further concerns in this paper.
-------------------------	---

REVIEWER	Masamine Jimba The University of Tokyo, Japan
REVIEW RETURNED	12-Aug-2019

GENERAL COMMENTS	<p>The authors addressed many questions well and the manuscript has been greatly improved. However, the following points should be again carefully revised.</p> <p>1. Developing countries mean what? Does it also include upper-middle income countries such as Thailand? Although this point was addressed, the authors are still using 'developing countries' in the main manuscript.</p> <p>2. Is it possible to justify the literature search period 'between 2008 and 2018'? Is there any possibility that before 2008 and after 2008 make a difference?</p> <p>For this question, the authors responded that there were only slight differences. On example about witchcraft was also added. Is it only something new in this article? In conclusion, intersectoral collaboration was recommended to improve the utilization. Is it also new which was not mentioned in the previous systematic review in 2008? There must be a way to emphasize the similarities and differences between two reviews in the abstract and the conclusion of the main manuscript.</p> <p>3. References: Please check references one by one. For example, Ref 103, 108 are not correctly spelled.</p> <p>For this question, I showed only two examples and the authors revised these two, though Ref 108 still remains incomplete. These were just examples, and there were many, many errors in this section. I do not think the authors take this point seriously. For example, again, look at Ref 4 and Ref 10. Are they the same journal? Ref 21, what do you mean by BMC Public Heal? Please check references one by one. Or else, I have to check it again in the next revised manuscript.</p> <p>4. It depends on a journal policy, but I wonder if registration to PROSPERO, etc is not required for the systematic review articles.</p>
-------------------------	---

VERSION 2 – AUTHOR RESPONSE

Dear Reviewers,

Thank you for the comments, suggestions, and corrections on the manuscript. We have made efforts to address them and revise the manuscript in line with the comments. The changes have been highlighted. We appreciate the thorough review you have given to our manuscript.

The authors addressed many questions well and the manuscript has been greatly improved. However, the following points should be again carefully revised.

1. Developing countries mean what? Does it also include upper-middle income countries such as Thailand? Although this point was addressed, the authors are still using 'developing countries' in the main manuscript.

Response from authors: The statement does not include upper middle income countries like Thailand and has been rephrased appropriately in the text.

2. Is it possible to justify the literature search period 'between 2008 and 2018'? Is there any possibility that before 2008 and after 2008 make a difference?

For this question, the authors responded that there were only slight differences. On example about witchcraft was also added. Is it only something new in this article? In conclusion, intersectoral collaboration was recommended to improve the utilization. Is it also new which was not mentioned in the previous systematic review in 2008? There must be a way to emphasize the similarities and differences between two reviews in the abstract and the conclusion of the main manuscript.

Response from authors: The review used 2008 to limit the search because a similar review had been published in 2008 and needed an update after 10 years especially as it included only a few studies from Africa. This was highlighted in the background section. The determinants of utilisation of ANC identified from our review were similar, reflecting the social and other non-health determinants of health which continue to create inequity in access and utilisation of health services in low resource settings such as SSA. Although they were identified in the older review, our findings show that they affect ANC utilisation in SSA. Since these determinants span different sectors which have in times past operated solely on their sectoral mandate without collaboration, the authors recommended intersectoral collaboration. Intersectoral collaboration is still pertinent to the sub-Saharan setting even though it was mentioned in an older review (which covered mostly Asian countries, however, intersectoral collaboration was not the explicit recommendation in this older review). Although previously recommended by another study, our study findings show that its implementation is still important in addressing the health issues influenced by non-health sector factors in SSA. More so, intersectoral collaboration is in line with systems thinking.

The relevant aspects of the review of 2008 were also compared with our findings in the discussion section. As was advocated by the reviewers in the last round of corrections, we conformed to the categories in the Andersen framework in the discussion hence not all single variables that differed between the two reviews were discussed.

Regarding recommendation, the 2008 review recommended training of health workers, female education and more research while we proffered intersectoral collaboration (with examples) and community participation as our recommendations.

Since the objective of this review was not to compare findings of the 2008 review with our review (although this was captured in the review of literature and discussion) and having mentioned the review of 2008 in the background and discussion sections, the authors do not think that it is still necessary to compare the two reviews in the abstract and conclusion sections of the manuscript.

The authors did not clearly understand what is expected from us regarding this comment however we have attempted to summarise the main differences between the review of 2008 and our review as listed below:

Objective:

2008: To identify factors affecting the utilization of antenatal care in developing countries.

2019: To identify the determinants of antenatal care utilisation in sub-Saharan Africa

Studies included

2008: 28 quantitative and 4 qualitative studies. Eighteen of the 28 studies were set in Asia, seven in Africa, two in Latin America and one in the Caribbean. Only four African studies were listed in the tables and they are Nigeria, Ghana, Ethiopia, and Kenya.

2019: 74 quantitative only studies conducted in sub-Saharan Africa across 23 countries.

Differences in Determinants identified in 2008 but not in 2019

Local beliefs such as fear of witchcraft, availability of services, availability of health workers and waiting time

Differences in Determinants identified in 2019 but not in 2008

Visit and advice from health workers, content/type of ANC services and type of health facility.

Similarities in Determinants identified in 2008 and 2019

Socio-economic status, residence, age, parity, education, education of partner, employment status, employment status of partner/husband, marital status, religion, awareness/knowledge, exposure to mass media, attitude towards antenatal care planning of pregnancy, previous pregnancy complications, autonomy, family/husband's support, distance to health facility, health insurance, cost of services.

Recommendation

2008: Comprehensive health promotion through awareness-raising and appropriate education of healthcare workers, increasing women's participation in education, further (qualitative) research into women's perceptions of and satisfaction with ANC and other maternity services

2019: Intersectoral collaboration to promote female education and empowerment, improve geographical access and strengthened implementation of antenatal care policies with active community participation is recommended

3. References: Please check references one by one. For example, Ref 103, 108 are not correctly spelled.

For this question, I showed only two examples and the authors revised these two, though Ref 108 still remains incomplete. These were just examples, and there were many, many errors in this section. I do not think the authors take this point seriously. For example, again, look at Ref 4 and Ref 10. Are they the same journal? Ref 21, what do you mean by BMC Public Heal? Please check references one by one. Or else, I have to check it again in the next revised manuscript.

Response from authors: The authors apologize for this. Each reference has been reviewed and corrected appropriately.